

REMARKS

This Amendment is in response to the Office Action mailed. In the Office Action, the Examiner rejected claims 1-24 under 35 U.S.C. § 112, and rejected claims 1-24 under 35 U.S.C. § 103. Reconsideration in light of the amendments and remarks made herein is respectfully requested.

Rejection Under 35 U.S.C. § 112

3. The Examiner rejects claims 1-24 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner asserts that the claim language is unclear and indefinite for the following reasons:

i) The Examiner asserts that for claim 1, line 2, it is uncertain what a control flag is. The Examiner asserts that claims 6, 12, 17 have the same deficiencies as claim 1.

Regarding claim 1, applicant has amended the claim to more clearly point out and distinctly claim the invention by amending the claim to provide that the claim is for a method for setting an operating mode of a processor by writing a control flag. Applicant respectfully submits that this amendment makes clear that the control flag is an element that sets an operating mode of the processor as disclosed in paragraph [0017] of the specification.

Regarding claim 6, applicant has amended the claim to more clearly point out and distinctly claim the invention by amending the claim to provide that the claim is for a method for determining an operating mode of a processor by reading a control flag. Applicant respectfully submits that this amendment makes clear that the control flag is an element that controls an operating mode of the processor as disclosed in paragraph [0017] of the specification.

Regarding claim 12, applicant has amended the claim to more clearly point out and distinctly claim the invention by amending the claim to provide that the control flag is to determine an operating mode of the processor. Applicant respectfully submits that this amendment makes clear that the control flag is an element that controls an operating mode of the processor as disclosed in paragraph [0017] of the specification.

Regarding claim 17, applicant has amended the claim to more clearly point out and distinctly claim the invention by amending the claim to provide that the control flag is to determine an operating mode of the processor. Applicant respectfully submits that this amendment makes clear that the control flag is an element that controls an operating mode of the processor as disclosed in paragraph [0017] of the specification.

ii) The Examiner asserts that for claim 9, it is uncertain what the difference is between "a shadow location" and a guest virtual machine. The Examiner further asserts that it is uncertain what is meant by the processor and what it includes. The Examiner asserts that claims 12, 22 have the same deficiencies as claim 9.

Regarding claim 9, applicant has amended the claim to more clearly point out and distinctly claim the invention by amending the claim to provide that the claimed processor comprises a processor control register, a pointer to a guest virtual machine context, and an execution unit. Applicant respectfully submits that this clarifies what the processor includes and claims the processor in a manner that is supported by the specification. Further, the control flag is claimed as being included in the processor control register, which is an element of the processor, and the shadow location is claimed as being in the guest virtual machine context which is in a portion of a random access memory (RAM) coupled to the processor. Applicant respectfully submits that it is now clear that the control flag is written to the processor control

register, a location not in the guest virtual machine context, if the control flag is owned by the guest virtual machine. Further, the control flag is written to the shadow location in the guest virtual machine context if the control flag is not owned by the guest virtual machine.

Regarding claim 12, the control flag is claimed as being included in the processor control register which is an element of the processor. The shadow location is claimed as being in a guest virtual machine context in a memory coupled to the processor. Applicant respectfully submits that it is clear that the writing of the control flag is either to the processor control register of the processor or to a location in a memory coupled to the processor based on the ownership of the control flag by the writing guest virtual machine.

Regarding claim 22, applicant has amended the claim to more clearly point out and distinctly claim the invention by amending the claim to provide that the claimed processor control register is outside the guest virtual machine context. context which is in a portion of a random access memory (RAM) coupled to the processor. Applicant respectfully submits that it is now clear that the control flag is written to the processor control register, a location not in the guest virtual machine context, if the control flag is owned by the guest virtual machine. Further, the control flag is written to the shadow location in the guest virtual machine context if the control flag is not owned by the guest virtual machine.

Applicant respectfully requests that the Examiner withdraw the rejection of claims 1-24 under 35 U.S.C. § 112, second paragraph.

Rejection Under 35 U.S.C. § 103

5. The Examiner rejects claims 1, 6, 12 and 17 under 35 U.S.C. § 103(a) as being unpatentable over Bennett et al, Pub No. US 2004101 17532 (hereafter Bennett) in view of Lange et al, Patent No. 4,298,935 (hereafter Lange).

7. **As per claims 1, 12 and 17**, the Examiner asserts that Bennett teaches a method for writing a control flag by the guest virtual machine, substantially as claimed, mapping the control flag to the interrupt. The Examiner admits that Bennett does not specifically teach that the control flag is included in a processor control register of a processor. However, the Examiner asserts that Lange teaches that control flag may specifically included as part of the register in a processor (Column 6, lines 1-15) for the purpose of CPU maintenance and that it would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Bennett with the specifics that the control flag is included in a process, as taught by Lange, because it allows for CPU maintenance.

Applicant respectfully submits that the claims, as amended, make clear that the control flag controls an operating mode of the processor by what is written to the control flag. Thus, the claimed control flag is entirely unlike the interrupt disclosed by Bennett which causes a transfer in the control flow (Para. 1) and not a change in the operating mode of the processor as now claimed. Lange discloses a register that provides one of five signals used to control a CPU. However, neither Lange nor Bennett teach or suggest that an attempt to write a flag in the processor's register by a guest virtual machine can be written to the register if the flag is owned by the guest virtual machine but diverted to a shadow location in a memory coupled to the processor if the flag is not owned by the guest virtual machine. Thus, the claimed invention causes a write of a control flag by a guest virtual machine to be routed either to a register that is

part of the processor or to a memory location outside the processor, which is neither taught nor suggested by Lange or Bennett, alone or in combination.

Applicant respectfully requests that the Examiner withdraw the rejection of claims 1, 6, 12 and 17 under 35 U.S.C. § 103(a) as being unpatentable over Bennett in view of Lange.

8. The Examiner rejects claims 1, 6, 7, 12 and 17 under 35 U.S.C. 103(a) as being unpatentable over Donovan et al., Patent No. 7,251,815 (hereafter Donovan) in view of Lange et al, Patent No. 4,298,935 (hereafter Lange).

10. **As per claims 1, 12, 17**, the Examiner asserts that Donovan teaches a method for writing a control flag, substantially as claimed. The Examiner admits that Donovan does not specifically teach that the control flag is included in a processor control register of a processor. However, the Examiner asserts that Lange teaches that control flag may specifically included as part of the register in a processor (Column 6, lines 1-15) for the purpose of CPU maintenance and that it would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Donovan with the specifics that the control flag is included in a process, as taught by Lange, because it allows for CPU maintenance.

Applicant respectfully submits that the claims, as amended, make clear that the control flag controls an operating mode of the processor by what is written to the control flag. Thus, the claimed control flag is entirely unlike the pointer to a work item disclosed by Donovan which allows a virtual machine to add or remove items to work queues (col. 4, lines 46-57) and not a change in the operating mode of the processor as now claimed. Lange discloses a register that provides one of five signals used to control a CPU. Donovan discloses that the work queues are stored in a shared memory accessible to each of the virtual machines (col. 4, lines 46-57). The

shared work queue, which is distinguished from a semi-dedicated work queue by allowing several virtual machines to remove items from the queue, is also stored in the shared memory (col. 7, lines 15-17). Both the shared and the semi-dedicated work queues allow each of the virtual machines to add items to work queues (col. 4, lines 46-57). Thus, one having ordinary skill in the art at the time of the applicant's invention would not find it obvious to apply the teaching of Lange to Donovan and store a work item in a processor register because queues are open ended data structures not typically amenable to being stored in a register and because Donovan discloses that both the shared and the semi-dedicated work queues have many common attributes that would lead one having ordinary skill in the art to implement both types of queues in the same way.

11. **As per claim 6**, the Examiner asserts that Donovan teaches a method for reading a control flag, substantially as claimed, including reading the control flag from a processor control register if the control flag is not maintained in the shadow location (Column 6, lines 20-30: fetching work from either the semi-dedicated work queue or the shared work queue corresponds to reading from either the processor control register or the shadow location respectively).

Applicant respectfully submits that the claims, as amended, make clear that the control flag controls an operating mode of the processor by what is written to the control flag. Thus, the claimed control flag is entirely unlike the pointer to a work item disclosed by Donovan which allows a virtual machine to add or remove items to work queues (col. 4, lines 46-57) and not a change in the operating mode of the processor as now claimed. Donovan discloses that the work queues are stored in a shared memory accessible to each of the virtual machines (col. 4, lines 46-57). The shared work queue, which is distinguished from a semi-dedicated work queue by allowing several virtual machines to remove items from the queue, is also stored in the shared

memory (col. 7, lines 15-17). Both the shared and the semi-dedicated work queues allow each of the virtual machines to add items to work queues (col. 4, lines 46-57). Donovan discloses that both the shared and the semi-dedicated work queues have many common attributes which would lead one having ordinary skill in the art to implement both types of queues in the same way and not use memory for the semi-dedicated work queues and processor registers for the shared work queues (assuming it was even possible to implement the queues in registers).

12. **As per claim 7**, the Examiner asserts that Donovan discloses determining whether the control flag is owned by the guest virtual machine (Column 5, line 65-Column 6, line 2).

Applicant agrees that Donovan discloses determining whether a particular assignment is owned by the guest virtual machine but disagrees that the claimed control flag reads on the assignment disclosed by Donovan.

Applicant respectfully requests that the Examiner withdraw the rejection of claims 1, 6, 7, 12, and 17 under 35 U.S.C. § 103(a) as being unpatentable over Donovan in view of Lange.

13. The Examiner rejects claims 2, 8, 9, 13, 18 and 22 under 35 U.S.C. 103(a) as being unpatentable over Donovan et al., Patent No. 7,251,815 (hereafter Donovan) in view of Lange et al., Patent No. 4,298,935 (hereafter Lange) further in view of Khalil et al., Patent No. 7,218,634 (hereafter Khalil).

15. **As per claims 2, 8, 9, 13, and 18**, applicant relies on the patentability of the claims from which these claims depend to traverse the rejection without prejudice to any further basis for patentability of these claims based on the additional elements recited.

As per claims 9 and 22, the Examiner asserts that Donovan teaches a processor substantially as claimed. The Examiner admits that Donovan does not specifically teach a first

mask word in the guest virtual machine context, the first mask word to include a first flag to indicate whether the flag is owned by the guest virtual machine. However, the Examiner asserts that Khalil teaches a method that uses a mask word to determine who the receiver of a message is suppose to go to for the purpose of ensuring correct communication pathway between sender and receiver (Column 7, lines 1-10).

Applicant respectfully submits that the claims, as amended, make clear that the control flag controls an operating mode of the processor by what is written to the control flag. Thus, the claimed control flag is entirely unlike the pointer to a work item disclosed by Donovan which allows a virtual machine to add or remove items to work queues (col. 4, lines 46-57) and not a change in the operating mode of the processor as now claimed. Donovan discloses that the work queues are stored in a shared memory accessible to each of the virtual machines (col. 4, lines 46-57). The shared work queue, which is distinguished from a semi-dedicated work queue by allowing several virtual machines to remove items from the queue, is also stored in the shared memory (col. 7, lines 15-17). Both the shared and the semi-dedicated work queues allow each of the virtual machines to add items to work queues (col. 4, lines 46-57). Donovan discloses that both the shared and the semi-dedicated work queues have many common attributes which would lead one having ordinary skill in the art to implement both types of queues in the same way and not use memory for the semi-dedicated work queues and processor registers for the shared work queues (assuming it was even possible to implement the queues in registers).

Applicant respectfully requests that the Examiner withdraw the rejection of claims 2, 8, 9, 13, 18 and 22 under 35 U.S.C. § 103(a) as being unpatentable over Donovan in view of Lange and further in view of Khalil.

16. The Examiner rejects claims 3-4, 14-15 and 19-20 under 35 U.S.C. 103(a) as being unpatentable over Donovan et al., Patent No. 7,251,815 (hereafter Donovan) in view of Lange et al, Patent No. 4,298,935 (hereafter Lange) further in view of Bugnion et al., Patent No. 6,944,699 (hereafter Bugnion).

18. **As per claims 3, 14, 19**, the Examiner asserts that Donovan teaches the invention substantially as claimed. The Examiner admits that Donovan does not specifically teach exiting to a virtual machine monitor if the control flag is not owned by the guest virtual machine and is not maintained in the shadow location. However, the Examiner asserts that Bugnion teaches exiting to a virtual machine monitor if the control flag is not owned by the guest virtual machine for the purpose of letting the VMM handle flags that the guest virtual machine cannot handle (Column 6, lines 25-37).

Applicant respectfully disagrees that Donovan discloses the invention substantially is claimed as discussed above. Applicant respectfully disagrees further that Bugnion discloses exiting to a virtual machine monitor if the control flag is not owned by the guest for the machine. Bugnion discloses that a virtual machine never accesses the privilege state of the processor regardless of the setting of a processor (column 6 line 34-36). Thus Bugnion teaches away from providing a shadow location for the control flag so that the virtual machine can complete a write of the control flag without exiting to the virtual machine monitor.

19. **As per claims 4, 15, 20**, the Examiner asserts that Donovan teaches wherein determining whether the control flag is maintained in a shadow location is performed only if the control flag is not owned by the guest virtual machine (Column 5, line 65-Column 6, line 3).

Donovan discloses that a work item may be assigned to a particular virtual machine based on a special ability of that virtual machine to handle the assigned work item rather than being

assigned based on load balancing considerations, such as whether a virtual machine is currently idle (column 5, line 59-column 6, line 3). Assigning a work item to a work queue is entirely unlike the claimed determining whether the control flag is owned by the guest virtual machine. Donovan discloses that a Work Queue Assignment Function (WQAF) determines whether to assign a work item to a semi-dedicated work queue or to a shared work queue (column 5, line 37-41). Assigning a work item to either a semi-dedicated or shared work queue is entirely unlike the claimed writing of the control flag to either a processor control register or a shadow location because the work queues are always in shared memory and writable by all virtual machines while both a control flag in a processor control register and a shadow location are writable by most one virtual machine.

Applicant respectfully requests that the Examiner withdraw the rejection of claims 3-4, 14-15 and 19-20 under 35 U.S.C. § 103(a) as being unpatentable over Donovan in view of Lange and further in view of Bugnion.

20. The Examiner rejects claims 5, 10, 11, 16, 21 and 23-24 under 35 U.S.C. 103(a) as being unpatentable over Donovan et al., Patent No. 7,251,815 (hereafter Donovan) in view of Lange et al., Patent No. 4,298,935 (hereafter Lange) further in view of Khalil et al., Patent No. 7,218,634 (hereafter Khalil) in view of Bugnion et al., Patent No. 6,944,699 (hereafter Bugnion).

21. **As per claims 10, 23**, the Examiner admits that Donovan in view of Khalil does not specifically teach an exit to a virtual machine monitor if the control flag is not owned by the guest virtual machine and is not maintained in the shadow location.

However, the Examiner asserts that Bugnion teaches exiting to a virtual machine monitor if the control flag is not owned by the guest virtual machine for the purpose of letting the VMM handle flags that the guest virtual machine cannot handle (Column 6, lines 25-37).

Applicant respectfully disagrees that Bugnion discloses exiting to a virtual machine monitor if the control flag is not owned by the guest for the machine. Bugnion discloses that a virtual machine never accesses the privilege state of the processor regardless of the setting of a processor (column 6 line 34-36). Thus Bugnion teaches away from the claimed conditional exit to the virtual machine monitor.

22. **As per claims 5, 11, 16, 21, 24**, the Examiner asserts that Khalil teaches using different flags to indicate who the proper receiver of a message should be (Column 7, lines 1-10).

Applicant respectfully disagrees that Khalil discloses testing a flag to determine if a control flag is maintained in a shadow location. Khalil discloses a number of fields that are found in an IPv4 information packet's IP header. Khalil discloses that some of the fields provide information that can be used to reassemble multiple-packet messages (column 6, line 59-column 7, line 10). This is unlike a flag that identifies whether a control flag in a processor control register is maintained in a shadow location because the flag identifies whether or not the guest machine can write the control flag while the fields disclosed by Khalil identify where an information fragment belongs within a multi-packet message.

The Examiner asserts that it would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to modify the teachings of Donovan with a method that uses a mask word to determine who the receiver of a message is suppose to go to, as taught by Khalil, such that the mask may be used to determine where the flag should go to in this specific case, because it helps to ensure correct communication pathway between sender and receiver.

The Examiner as asserts that it would have been obvious to one having ordinary skill in the art to use as many flags as needed according to the number of different receivers such that a system can properly use these flags to determine where the message should go to such that wherein the execution control unit is responsive to the second flag only if the first flag indicates that the control flag is not owned by the guest virtual machine, because this allows for proper communication between entities.

Applicant respectfully disagrees that it would have been obvious to one having ordinary skill in the art at the time of the applicant's invention to apply the disclosures of Khalil. Khalil discloses registration and hand-off procedures for a mobile node in a packet-based communication network. One of ordinary skill attempting to solve the problem of efficiently writing a control flag in a processor control register by a guest virtual machine would not consider packet-based communications techniques as relevant art.

Applicant respectfully requests that the Examiner withdraw the rejection of claims 5, 10, 11, 16, 21 and 23-24 under 35 U.S.C. § 103(a) as being unpatentable over over Donovan in view of Lange, in view of Khalil, and further in view of Bugnion.

Response to Arguments

Applicant thanks the Examiner for the careful consideration of the previously filed arguments and the detailed response thereto. Applicant has carefully considered the Examiner's response and has attempted to address each and every issue raised by the Examiner. If the Examiner finds that this response fails to place the application in condition for allowance, applicant invites the Examiner to initiate a telephonic interview for the purpose of discussing any remaining issues.

Conclusion

Applicant reserves all rights with respect to the applicability of the doctrine of equivalents. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: 09/11/2009

By */James Henry/*
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Attachments

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From: Jim Henry
Sent: Friday, August 28, 2009 10:45 AM
To: 'mengyao.zhe@uspto.gov'
Subject: 10/813,896 Proposed Claim Amendments (42390P17828)

Attachments: P17828_20090623_Proposed-Amendments.pdf



P17828_20090623_
Proposed-Amend...

Examiner Zhe:

Thank you for reviewing the attached proposed claim amendments with regard to the outstanding rejections under 35 U.S.C. 112, second paragraph. Please call me after you have reviewed the claims to discuss whether all outstanding 112 issues would be addressed by these amendments.

Thank you,
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Applicant : Gehad Galal
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Commissioner for Patents
P.O. Box 1450
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PROPOSED CLAIM AMENDMENTS

Sir:

The following proposed amendments to claims 1 and 9 are provided for the purposes of discussion with regard to the outstanding rejections under 35 U.S.C. § 112, second paragraph:

Listing of Claims:

1. (Currently Amended)

A method for setting an operating mode of a processor by writing a control flag included in a processor control register of ~~a processor~~ the processor by a guest virtual machine, the method comprising:

determining whether the control flag is owned by the guest virtual machine;

writing the control flag to the processor control register if the control flag is owned by the guest virtual machine; and

writing the control flag to a shadow location in a guest virtual machine context in a memory coupled to the processor if the control flag is not owned by the guest virtual machine.

9. (Currently Amended)

A processor comprising:

a processor control register ~~to include~~ that includes a control flag; flag that determines an operating mode of the processor;

a pointer to a guest virtual machine ~~context;~~ context in a portion of a random access memory (RAM) coupled to the processor;

~~a first mask word in the guest virtual machine context, the first mask word to include a first flag to indicate whether the control flag is owned by a guest virtual machine associated with the guest virtual machine context;~~

~~a shadow location in the guest virtual machine context;~~

an execution control unit

to test a first flag in the guest virtual machine context, the first flag to indicate whether the control flag is owned by a guest virtual machine associated with the guest virtual machine context, and

to cause a write of the control flag by the guest virtual machine to be directed to the processor control register if the control flag is owned by the guest virtual machine and to be redirected to ~~the shadow~~ a shadow location in the guest virtual machine context if the control flag is not owned by the guest virtual machine.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: 08/28/2009

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